



December 11, 2015

Ashley Newbry
Idaho Department of Water Resources
322 East Front Street
Boise, ID 83720
VIA EMAIL

Subject: 2015 Annual Water Level Monitoring Report (Permit 61-12090)

Dear Ms. Newbry,

This report summarizes water level data collected from the Elk Creek Village shallow Monitoring Well (MW-1) and the Elk Creek Village Production Well (PW-1). Monitoring of groundwater production and groundwater levels in these wells (Figure 1) is required under Permit 61-12090. Monitoring protocols are outlined in a monitoring plan dated February 15, 2012, which was approved by IDWR on March 26, 2012.

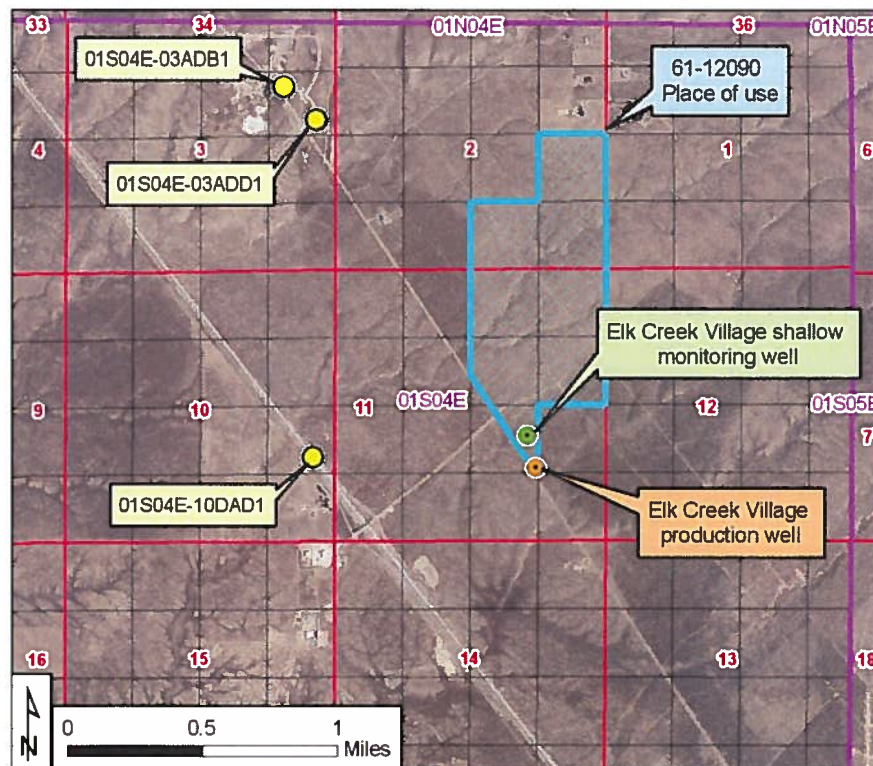


Figure 1. Elk Creek Monitoring Plan Base Map

PW-1 is not yet being used for production. However, groundwater levels have been measured in both MW-1 and PW-1 since October 3, 2011. Transducers and dataloggers have measured and recorded water levels on a 6-hour intervals (with exceptions – see below). Manual measurements coinciding with datalogger downloads have occurred on a bimonthly or quarterly basis since October 2011.

Manual Water Level Monitoring

Manual groundwater-level measurements collected in MW-1 and PW-1 are listed in Table 1. These readings were made with the same Powers Electric line sounder to ensure consistency from measurement to measurement (although the sounding tape was replaced in January 2015).

Table 1. Manual depth to water observations at MW-1 and PW-1

Date	MW-1 Depth to Water (ft, BTOC)	PW-1 Depth to Water¹ (ft, BTOC)
10/3/2011	354.73	343.90
12/9/2011	354.65	342.40
2/17/2012	354.18	342.26
4/6/2012	353.87	342.00
6/28/2012	353.72	342.06
8/30/2012	353.73	343.30
10/18/2012	353.76	342.28
12/27/2012	353.27	341.79
2/13/2013	353.50	341.80
3/8/2013 ²	353.50	---
4/19/2013	353.50	241.46
6/25/2013	353.15	341.61
9/26/2013	353.02	341.76
12/18/2013	353.12	341.58
3/25/2014	352.85	341.18
7/9/2014	351.62	340.40
9/4/2014	351.58	340.35
12/15/2014	351.46	340.19
3/30/2015	355.62	344.26
10/2/2015	356.90	344.50

¹PW-1 depth to water measured relative to top of oil

²Off-cycle monitoring at MW-1 to repair the water level transducer

Continuous Water Level Monitoring

Solinst Levellogger pressure transducers were installed in MW-1 and PW-1 in October 2011. A single Solinst Barologger was installed in MW-1 to compensate recorded water level observations for fluctuations in atmospheric pressure. The Levelloggers in MW-1 and PW-1 were suspended via approximately 400 feet of stainless steel cable attached to an I-bolt affixed to the top of the well casing, which submerged the Levelloggers between 40 and 60 feet below static water level conditions. As of October 2011, all Levellogger and Barologger pressure transducers were set to record water levels (or barometric pressure for the Barologger) at 6 hour intervals.

At each data download, a calibrated electric line sounder was used to manually measure the depth to water (DTW) relative to the top of the well casing. The manually recorded DTW, along with barometric data, was used to generate a calibrated time series of groundwater level relative to the top of the casing (Figure 2). Electronic records of continuous DTW measurements at MW-1 and PW-1, from October 2011 to October 2015, are included as an attachment with this report.

Analysis

Review of manual water level measurements and continuous water level recordings from October 2011 to October 2015 suggest that (1) ground water levels are relatively stable and (2) a continuous downward hydraulic gradient has been present during the sampling period.

Please let me know if you have any questions regarding the data collected to date. The next quarterly sampling event is scheduled this winter.

Sincerely,



Ashley Ritter, E.I.T
Associate Engineer

Cc: Brian Whitacker, Woods Erickson Whitaker & Maurice LLP
Norm Semanko, Moffatt Thomas Barrett Rock & Fields, Chtd.
Christian Petrich, SPF Water Engineering, LLC
SPF File No. 591.0050

Attachment: Electronic data file (spreadsheet)

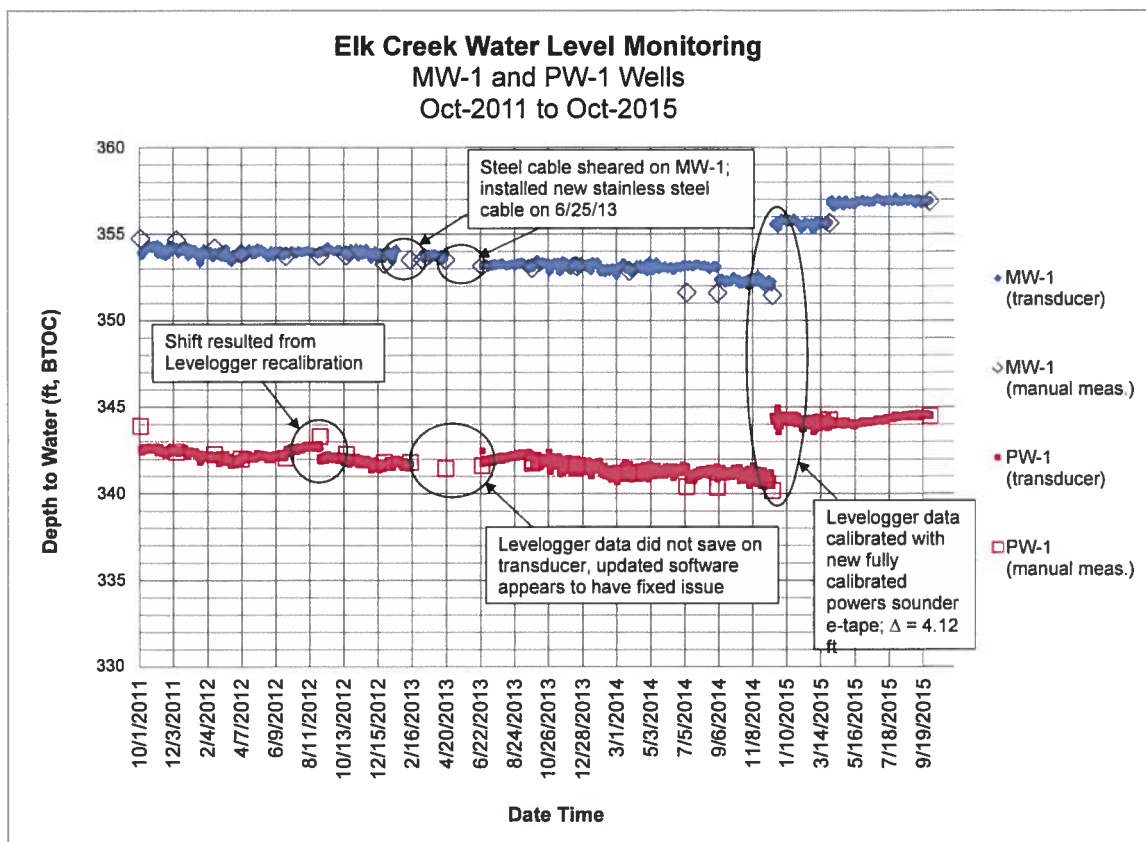
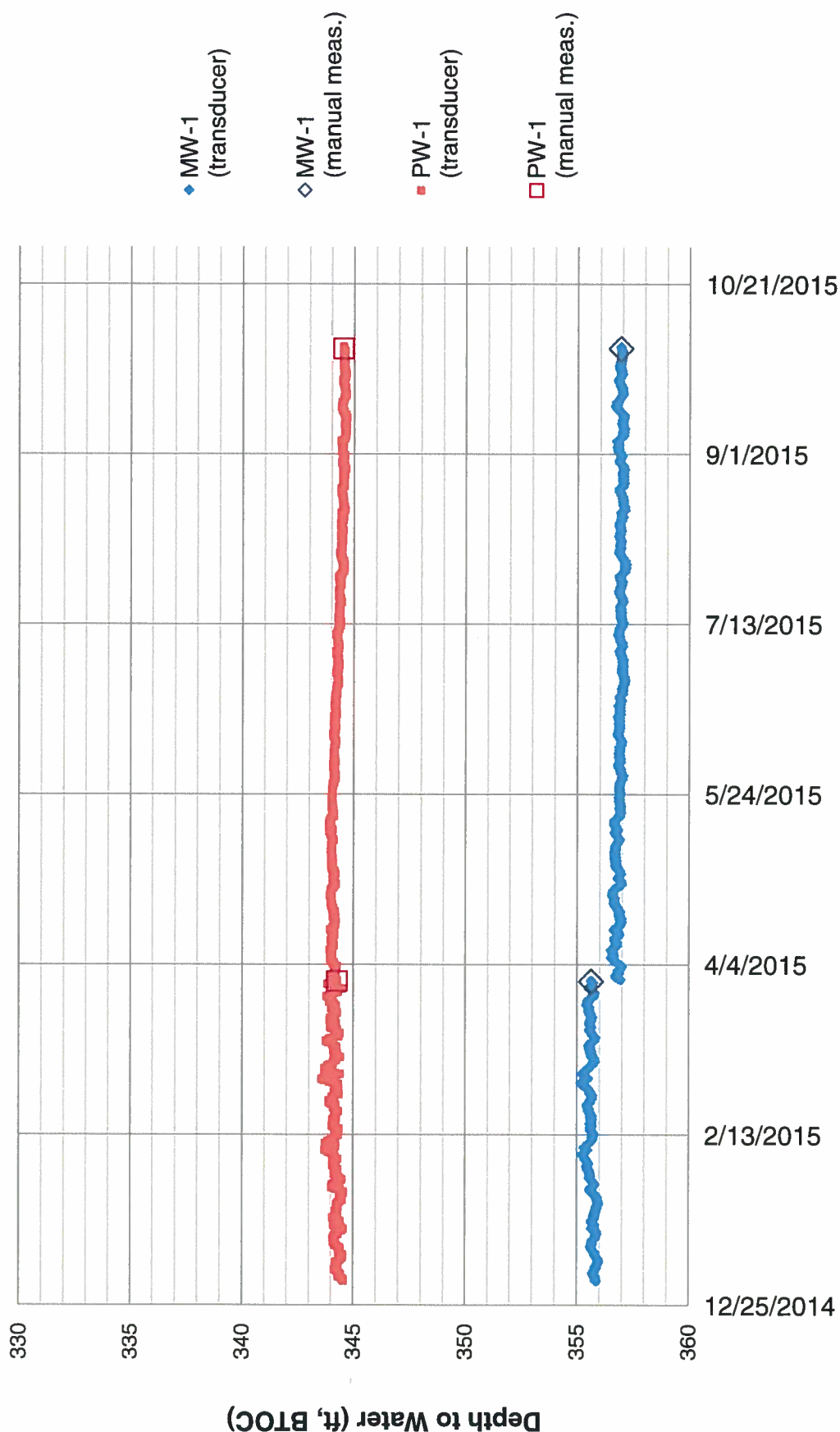


Figure 2. Continuous Water Level Monitoring Results.

Elk Creek Water Level Monitoring

MW-1 and PW-1 Wells

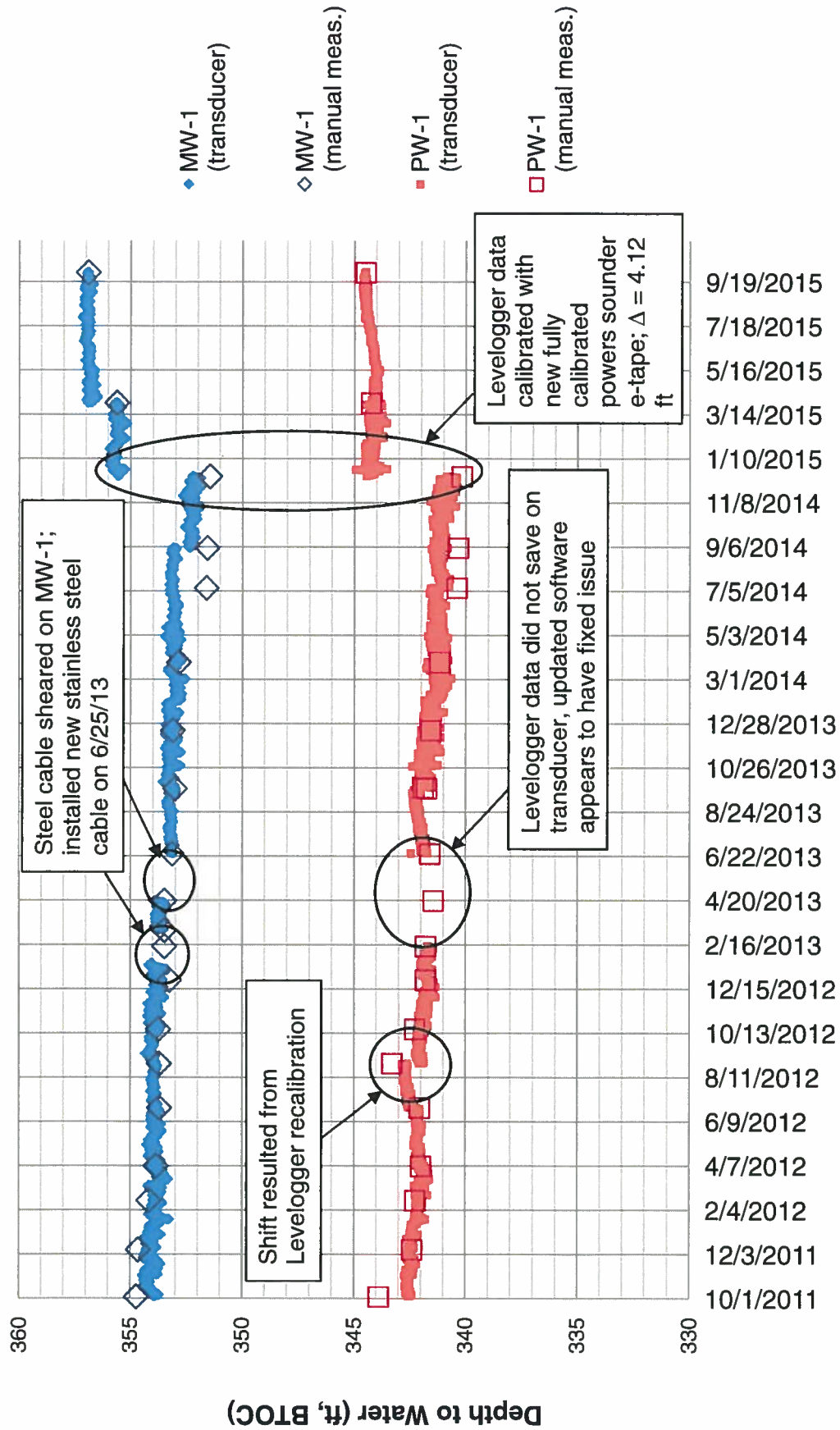
Jan-2015 to Oct-2015



Elk Creek Water Level Monitoring

MW-1 and PW-1 Wells

Oct-2011 to Oct-2015



Date	MW-1 Depth to Water (ft, BTOC)	PW-1 Depth to Water¹ (ft, BTOC)
10/3/2011	354.73	343.90
12/9/2011	354.65	342.40
2/17/2012	354.18	342.26
4/6/2012	353.87	342.00
6/28/2012	353.72	342.06
8/30/2012	353.73	343.30
10/18/2012	353.76	342.28
12/27/2012	353.27	341.79
2/13/2013	353.50	341.80
3/8/2013 ²	353.50	---
4/19/2013	353.50	241.46
6/25/2013	353.15	341.61
9/26/2013	353.02	341.76
12/18/2013	353.12	341.58
3/25/2014	352.85	341.18
7/9/2014	351.62	340.40
9/4/2014	351.58	340.35
12/15/2014	351.46	340.19
3/30/2015	355.62	344.26
10/2/2015	356.90	344.50

¹PW-1 depth to water measured relative to top of oil

²Off-cycle monitoring at MW-1 to repair the water level transducer

Hand Measurements

MW-1

Date	DTW (manual meas., ft.)	DTW (manual meas., ft.)	Water Column (ft, trans.)	Depth to Trans. (ft,BTOC)	Comments
10/23/2011	354				
4/29/11 10:00 AM	353.69				
5/3/11 9:00 AM	353.99				
6/13/11 4:20 PM	353.55				
7/19/11 8:20 PM					355.92 (error?)
8/5/2011	353.64				
10/3/2011	354.73	358.04	39.0232	393.75	EB/SK, MP at top of PVC Casing, Powers Sounder
12/9/2011	354.65	357.96	38.79	393.44	EB, MP at top of PVC Casing, Powers Sounder
2/17/2012	354.18	357.49	39.05	393.23	EB, MP at top of PVC Casing, Powers Sounder
4/6/2012	353.87	357.18	39.09	392.96	EB, MP at top of PVC Casing, Powers Sounder
6/28/2012	353.72	357.03	39.05	392.77	EB, MP at top of PVC Casing, Powers Sounder
8/30/2012	353.73	357.04	39.03	392.76	EB, MP at top of PVC Casing, Powers Sounder
10/18/2012	353.76	357.07	39.17	392.93	EB, MP at top of PVC Casing, Powers Sounder
12/27/2012	353.27	356.58	39.27	392.54	EB, MP at top of PVC Casing, Powers Sounder
2/13/2013	353.5	356.81			EB, MP at top of PVC Casing, Powers Sounder
3/8/2013	353.5	356.81	39.21	392.71	EB, MP at top of PVC Casing, Powers Sounder, had to rehang transducer on new cable ~400' in length
4/19/2013	353.5	356.81			EB, MP at top of PVC Casing, Powers Sounder
6/25/2013	353.15	356.46	39.64	392.79	EB, MP at top of PVC Casing, Powers Sounder
9/26/2013	353.02	356.33	39.75	392.77	EB, MP at top of PVC Casing, Powers Sounder
12/18/2013	353.12	356.43	39.59	392.71	EB, MP at top of PVC Casing, Powers Sounder
3/25/2014	352.85	356.16	39.76	392.61	EB, MP at top of PVC Casing, Powers Sounder
7/9/2014	351.62	354.93	39.61	391.23	(For June Period) EB, MP at top of PVC Casing, Powers Sounder; note Powers was rehabed, length of line may have changed.
9/4/2014	351.58	354.89	39.61	391.19	EB, MP at top of PVC Casing, Powers Sounder; note Powers was rehabed, length of line may have changed.
12/15/2014	351.46	354.77	39.69	391.15	EB, MP at top of PVC Casing, Powers
3/30/2015	355.62	355.62	39.71	395.33	New cable on Powers Sounder. EB, MP at top of PVC Casing, Powers Sounder; note Powers was rehabed, length of line may have changed.
10/2/2015	356.90	356.90	39.73	396.63	AR/SK, MP at top of PVC casing, WLS00-01 sounder.

Hand Measurements

PW-1

Date	DTW (manual meas., ft, BTOC)	Water Column (ft, trans.)	Depth to Trans. (ft, BTOC)	Comments
10/3/2011	343.9	143.64	487.54	EB/SK, MP at top of port on casing, Powers Sounder
12/9/2011	342.4	143.65	486.05	EB, MP at top of port on casing, Powers Sounder
2/17/12 12:00 AM	342.26	143.94	486.20	EB, MP at top of port on casing, Powers Sounder
4/6/12 12:00 AM	342.00	144.00	486.00	EB, MP at top of port on casing, Powers Sounder
6/28/12 12:00 AM	342.06	143.68	485.74	Depth to top of oil, EB, MP at top of port on casing, Powers Sounder
8/30/12 11:20 AM	343.30	143.53	486.83	Depth to top of oil, EB, MP at top of port on casing, Powers Sounder
10/18/2012	342.28	143.5607	485.84	Depth to top of oil, EB, MP at top of port on casing, Powers Sounder
12/27/2012	341.79	143.8875	485.68	Depth to top of oil, EB, MP at top of port on casing, Powers Sounder
2/13/2013	341.80	143.84	485.64	Depth to top of oil, EB, MP at top of port on casing, Powers Sounder
4/19/2013	341.46			Depth to top of oil, EB, MP at top of port on casing, Powers Sounder
6/25/2013	341.61	143.8377	485.45	Depth to top of oil, EB, MP at top of port on casing, Powers Sounder
9/26/2013	341.76	143.4669	485.23	Depth to top of oil, EB, MP at top of port on casing, Powers Sounder
9/27/2013	341.90	56.65	398.55	Had to rehang logger, new cable length of approximately 400', Depth to top of oil, EB, MP at top of port on casing, Powers Sounder
12/18/2013	341.58	56.12	397.70	Depth to top of oil, EB, MP at top of port on casing, Powers Sounder
3/25/2014	341.18	56.51	397.69	Depth to top of oil, EB, MP at top of
7/9/2014	340.40	56.66	397.06	(For June Period) Depth to top of oil, EB, MP at top of port on casing, Powers Sounder, note Powers was rehabed, length of line may have changed.
9/4/2014	340.35	56.62	396.97	Depth to top of oil, EB, MP at top of port on casing, Powers Sounder, note Powers was rehabed, length of line may have changed.
12/15/2014	340.19	56.58	396.77	Depth to top of oil, EB, MP at top of port on casing, Powers Sounder, note Powers was rehabed, length of line may have changed.
3/30/2015	344.26	56.63	400.89	New cable on Powers Sounder. Depth to top of oil, EB, MP at top of port on casing, Powers Sounder, note Powers was rehabed, length of line may have changed.
10/2/2015	344.50	56.45	400.95	AR/SK, Depth to top of oil, Powers sounder